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THE SCHOOLMASTER.

A

MONTHLY EDUCATIONAL JOURNAL.

CONTENTS.

		Page.
I.	A short retrospect of our past year	1
II.	Elementary Instruction in Science	3
III.	Points to be attended to while Copying	6
IV.	Geometry...	9
V.	Cure for Bad Spelling	11
VI.	Correspondence	13
VII.	School Punishments	15
VIII.	Notes of Lesson	21

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CONTENTS OF THE APRIL No 12 OF VOL. II.

I. Certain violations of Physical Law
II. Questions and Answers
III. How to use the Blackboard
IV. How to improve the Writing
V. On the teaching of Elementary Algebra
VI. L. T. Degree Papers

THE SCHOOLMASTER

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THE
SCHOOLMASTER.

A SHORT RETROSPECT OF OUR PAST YEAR.

The second year of our journal witnessed in our Presidency several changes and events in the Educational world. To Managers of Schools the most important event that has taken place during the last twelve-month is undoubtedly the new School-fee notification, which, although it does not give satisfaction to all parties—if such a thing be possible—at least secures for them the much-needed freedom from the constant dread of something worse being forced upon them, during the next five years. To us a no less important event was the extension of the application of the principle that those who adopt a profession or seek employment in a particular kind of work must prove their special fitness for it by passing certain Examinations or otherwise. Candidates for Deputy Inspectorships of Schools, are now required to pass an examination in all the branches of their work. A certificate of having passed this Examination does not entitle one to be regarded as an ideal Deputy Inspector any more than a Normal certificate argues that its possessor is an ideal teacher. Yet it is quite as necessary that an Inspecting Officer should know his duties well before entering upon them as it is that a schoolmaster should learn the rules and secrets of his profession before beginning to practise it.

The resolution of the Government of India requiring local Governments to see their way to appoint men in the Educational Department only to Directorships of Public Instruction is also framed with a view to prevent round men being put into square holes. Even this measure, we fear, will fail to give satisfaction to all parties—notably to specialists engaged as Professors in Colleges. Not that we mean that specialists can never make good Directors of Public Instruction. Dr. Duncan, for instance, who in our opinion, falls under the category of specialists, did not, as far as we are aware, give much room to doubt his administrative ability or justice. But the principle laid down by the Governor-General in Council is in the main very wholesome. The selection

161255

of Professors of Colleges for Inspectorships to give them administrative training may now and then subject local Governments to the suspicion of favouritism. But we doubt if any amount of legislation of the most ingenious kind will ensure on the part of people in authority conduct which is above suspicion. On the other hand, it must be a great comfort to those who are in the Department to know that it is somebody—whoever he may be—from their own ranks that will attain to the highest rung of the educational ladder.

The revival of the Madras Journal of Education under the editorship of Mr. Barrow, is by no means the least important occurrence of the year. Its aim is not restricted to any special function, as is ours; but it is devoted to all kinds of subjects that may be interesting and useful to persons engaged in the work of education. We need hardly say that we wish it a longer life in its second birth than it enjoyed in the first.

The L. T., degree examination was for the first time held this year. Three candidates presented themselves for it and all of them passed. We hope that this will encourage a great many others to appear for that examination. The prospects of schoolmasters are proverbially limited and they will be still more so in future, in as much as the policy of the Government is gradually to withdraw from higher education. Whenever opportunity occurs, we have seen, even professors of Colleges renounce "philosophy for quill-driving." And it is considered by a great many that examinations for teachers are so many disagreeable necessities tending to make the least attractive department less attractive if possible. Of course people will pass any examination that may be instituted, but not so much out of a love for the subjects read as with a view to improve their materal prospects. But as we have often said, quoting Professer Fitch, the schoolmaster's is the worst of trades but the best of professions. Money-making is incompatible with the schoolmaster's profession, which, however, has its own advantages. And such as care for these, will not, we are sure, feel the L. T. degree examination to be a nuisance.

To ourselves the year under review has been a prosperous one. Bearing in mind the fate that has befallen so many educational journals we will not venture to boast of our prosperity in any year. But whether our journal is destined to live a long or short life, our ardent desire is that it should live a *useful* one.

Tamil MSS
M15.3.1

ELEMENTARY INSTRUCTION IN SCIENCE.

The proposal made by Mr. Adam to remove Science from the Matriculation curriculum of the Madras University has deservedly met its doom. The cry everywhere now is that the education at present given in our schools is too classical and mathematical and that it ought to be made more scientific in its character. But here is a gentleman who wants to turn Science away from our doors. We will, however, try to believe that he brought forward the motion "simply as a matter of tactics," with a view to lead the people concerned to improve the present state of scientific instruction.

In the discussion which followed Mr. Adam's motion in the Senate it was admitted on all hands that the instruction in Science as at present given in our schools, was far from satisfactory, although competent judges alleged that every year an appreciable amount of progress was being made. The unsatisfactory results were also ascribed firstly to the incompetency of poor schoolmasters, and secondly to the want of the necessary apparatus in many a school. We grant both the statements in their full force. But we should like to ask whether the examiners are free from all blame in the matter. We are afraid not. If we look at the Science-papers set in the Matriculation Examination from the time when the subject was introduced to 1886, we shall observe two features about them which deserve notice. The earlier papers set when there was no Chemistry but only a portion of Physics to be brought up contained many questions which, considering that they were meant for beginners in Science, may be called questions rather in Mixed Mathematics than in Physics. Calculating pressures at given depths of liquids of given specific gravities under given conditions, calculating the height of the barometer under imaginary circumstances, calculating the time in which a stone projected upwards with a certain velocity would fall to the ground—such were the things among others that beginners were expected to know. We think, on the contrary, that at the commencement of Scientific instruction more importance should be attached to the experimental than to the mathematical side of the subject—more care should be taken to train the observational faculties of the students than to exercise their reasoning powers. But more of this further on.

The other feature to which we refer is the puzzling character of not a few questions now and then set at the Matriculation Examination. There are too many questions of this nature, which lead one to suspect that the object of the examiners was not to test the knowledge of the candidates but to pluck them or to shew off their (the Examiners') own ingenuity. It is

such questions that encourage in the minds of the candidates the mischievous notion that an examination is more or less a lottery. The natural consequence of this is that students consider Science to be an unsafe subject and rely for success mainly upon their ability to cram History and Geography. We are speaking from personal knowledge when we say this and we are sure we are not misrepresenting matters. We have no doubt that if Science is made a failing subject students will be compelled to pay more attention to it, but, as so many think, the time for such a change is not yet come. We are sure it will come ere long, that the teaching of Science will be placed on a proper footing and that no Adams in future will find it necessary or expedient even as a matter of tactics to bring forward a proposal like what *our* Mr. Adam has rendered himself notorious by.

In our opinion Science should not only be taught in the High School but a study of that subject should be begun in the Middle School. It is probably with this object that Huxley's Introductory Primer and the Physical Geography Primer are prescribed for one of the optional branches of the Middle School Examination. We have not much to say at present against the Physical Geography Primer, but we must confess we do not admire the choice of Huxley's book. Of course one must think twice before saying a word against a book written by such an Eminent Scientist as Professor Huxley, and we do not care to deny that it is an admirable book in itself, but we venture to think that it is highly unsuitable as a text-book for our Middle School boys. It must be remembered that Huxley's Primer is an Introduction to a series of Primers which deal with various Sciences both physical and moral. Accordingly we find in it definitions of Biology, Morphology, Psychology and a number of other ologies. Now what earthly good will it do to those who have just begun the study of Science to know a number of these definitions, or to know only by name the existence of a number of these Sciences? What should we think of a teacher who, before teaching notation and numeration in Arithmetic to his infant-pupils, explained to them as best he could the definitions of Arithmetic, Algebra, Geometry, Trigonometry and Conic Sections? It might be argued that, since it is desirable that the students when *they* grow up should know something about every science, a little bit of each, be it nothing more than a few definitions, should be taught at the commencement. But it seems to us that to ask the beginners to take a comprehensive survey of all the sciences on this ground is as absurd as to ask a Hindu infant to eat a mixture of rice, pepper-water, curry and buttermilk because it will have to eat all these when it grows up. The first 19 pages of Huxley's book are extremely uninteresting to students of the Middle School though they are interesting enough to those who already have a fair knowledge of science. It is simply absurd to talk about Induction and Deduction to beginners as Huxley does on page 18 of his Primer. Again how ridiculous it is to begin to teach science by telling the

boys that scientific results are based on Observation, Experiment and Reasoning! It is the well-known mistake of putting the general before the particular, the proverbial folly of putting the cart before the horse. By-the-bye when we criticise Huxley's book we do not mean to condemn it in itself —far from it—for *he* did not write it for *our Middle School boys*; we are only contending that it is not a suitable text book for our schools. It would have mattered very little whether the book was good or bad if our teachers understood the proper use of such a text-book or if all our examiners knew what should be expected from Middle School candidates. But no—our examiners, who seem to be extremely fond of laying snares and constructing pit-falls for the feet of their innocent victims, spare no pains to search out the most abstruse and most difficult parts of a text book and put questions on them. Thus in a paper set for the Middle School examination a few years ago we find questions asked on the very objectionable portions of Huxley's introductory which we have mentioned above. They remind us of a question asked by an examiner to a Lower Fourth Class, viz:—What was Euclid's object in writing his *Elements of Geometry*? We believe the learned gentleman found the answer to this question *at the outset* of the notes on Euclid given by somebody and since the boys were beginning the study of Geometry he expected them to know what is given at the beginning of the notes. Now can we wonder then that our boys are hopelessly given to cramming? Seeing that examinations are what they now are—and of course the teachers have already been condemned—we should have been surprised if there were no cram—more or less of it in our schools. The Director of Public Instruction is not to blame for prescribing Huxley's book, because there is hardly any better book to be substituted in its stead and if no text-book were prescribed there is no saying what vagaries our examiners would not indulge in. *With* text-books it is bad enough, *without* them it would be worse still.

What is the object of teaching science in the lower classes? It is, we believe, chiefly to train their observational powers. Now is this object served by telling the boys what deduction is, what induction is, what the difference between properties and powers is, &c? The powers of observation are best trained by what are called object lessons. But these should be given not only in the Middle School but in the Primary School also. Besides, object lessons will not form a proper and continuous course of scientific instruction and we aim at something more in teaching science—elementary instruction in science may very well begin in the Middle school. But the subject should here be taught by *oral lessons*, that is, the boys should not be required to make use of and depend upon text-books. They should learn from the living voice of the teacher, the tangible apparatus which can be handled and the experiments shown in the class. Of course, they must

have note-books of their own to take down what is necessary. The teacher may be guided in the arrangement of the subject by a text-book say, even Huxley's Introductory Primer. But he should be a competent person and should be able to distinguish what is suitable from what is unsuitable to the boys under his tuition. He should be allowed great liberty to eschew what is unsuitable and to add what is interesting, intelligible and useful to our boys. Let him carefully avoid all talk about Induction and Deduction, Atomic theory and Emission theory, and in the case of our boys probably anything about even watermills and hoar-frost. Let the instruction be adapted to local requirements and be based not so much upon text-books as upon the capacity and the surroundings of our students.

We know that objections will be raised by many against what we have suggested. It will be said, for instance, that in the absence of text-books, or if the text-books are not to be minutely gone through, there will be no uniformity of standard to be attained in all the schools of the Presidency, and that consequently there can be no public examinations as we now have to regulate promotions of boys from one class to another If both our teachers and examiners be what they ought to be, these objections will not have much force in practice. But it is desirable, we admit, that there should be a common standard fixed for the schools in the Presidency. There should be a better text-book than the Introductory for the guidance of the teachers. We would therefore suggest in conclusion (1) that Science should be introduced in the Middle School classes and (2) a suitable text-book or at least a syllabus drawn up by a committee or even a single experienced educationist appointed by the Director of Public Instruction for the purpose. For some time there will undoubtedly be some difficulty in getting competent teachers, but it will in course of time disappear.

H. N. R.

POINTS TO BE ATTENDED TO WHILE COPYING.

Very little attention is paid in schools to this most important subject notwithstanding the great usefulness of it to every one of us throughout life. A good hand is the first requisite to produce a good impression in the minds of our examiners in our school life and in the minds of our masters in our after life. The ink, pen, paper, and style are the four great

GEOMETRY.

CHAPTER I.

SOLIDS, SURFACES, LINES, AND POINTS.

1. *There are three kinds of substances, Viz, solids, liquids, and gases.*

A book, a table, a slate, a board, a bench, &c., are solids (from a word meaning *hard*).

Milk, water, oil, mercury, &c., are examples of liquids (from a word meaning *to flow*).

Air is an example of gas.

[Ask the boys to name certain objects in the room, show them that they are hard and teach them the name solid. In the same manner deal with the words liquid and gas. The teacher may now say that he is going to treat of solids and its parts only, in the present and succeeding lessons.]

2. *Solids are of two kinds—regular and irregular.*

A sphere, a cone, a cylinder, a pyramid, a prism, a regular tetrahedron, a cube, an octahedron, an hycosohedron, a parallelopiped, &c., are examples of regular solids. Stones, trees, and such like objects are examples of irregular solids.

[The teacher should provide himself with a box of all the solids and exhibit them to the class showing at the same time the peculiarities of each. In the absence of the above, it is not very difficult for the teacher to make some of them by paper or bricks. A cricket ball, the top of a plantain flower cut near the middle, or a மத்தாப்பு, a round ruler, a tower, the hangings of a lustre, the ordinary box are familiar examples of a sphere, cone, cylinder, pyramid, prism, parallelopiped respectively. The above may be elicited by asking the boys to name some familiar objects resembling the solids exhibited. The teacher may now give the technical names of some of the solids they could easily remember, but on no account should he burden their memory with mere names.]

3. *Solids have three dimensions, viz, length, breadth, and thickness.*

We can measure a book in three ways; all the three measurements are not the same.; the longest of these is the *length*; the measurement from top to bottom is the *thickness*; and the other is the *breadth*. Every pupil should be provided with a ruler quarter of an inch thick, 3 inch wide, and 1 foot long.

[Make the boys actually measure a book by a flat ruler and write down the measurements on the board. From the information given above draw out the names length, breadth, and thickness.]

4. *Height is the measurement of an object from the ground upwards ; and depth is the measurement of an object from the ground downwards.*

The measurements of a room are length, breadth, and height and when we speak of a well we say the depth of the well.

5. *A cube is a solid that has its length, breadth, and thickness equal.*

Take the cube from the box of solids and make the boys actually measure its dimensions ; hence elicit the definition.

6. *A boundary is the end or extremity of anything.*

The teacher should exhibit the box of solids and ask the boys to show the boundaries of each, noting the number of boundaries which each has.

7. *A Superficies or surface is the boundary of a solid ; it has length and breadth only : it has no thickness.*

The boundary of a body is its outside face or surface or superficies. A book has 6 surfaces. A sheet of paper has 6 surfaces. If water and oil be poured in a vessel, the separation between them is the boundary of both : it is neither oil nor water, it has length and breadth only but has no thickness. For if it had, it will be a solid and never the end or the boundary of a solid.

[Make the experiment of oil and water in the class and give them a good idea of what a surface is ; the teacher may give *shadow* as a familiar example of a superficies.]

8. *A plane superficies is that which is perfectly smooth, so that if you lay the edge of a rule upon it in any direction, the rule will touch it in every point.*

The surface of a paper or of a glass is flat, whereas the surface of a cricket ball is not flat. The surfaces of the former are called plane superficies. Those of the latter are called curved surfaces or superficies.

[Draw the attention of the class to the fact of a carpenter testing for himself whether a bench is flat or not by taking a rule and placing the edge of it against any surface ; if no light is seen between, it is a test that all the points of the flat rule coincide with all the points of the surface, and hence a plane. A carpenter and a mason do the same. Two bricks are placed one over the other, and rubbed against each other, until the little projecting portions in both are removed, and they coincide throughout their extent. The teacher may now take his box of solids and exercise the boys by asking them the kind and number of surfaces which each solid has.]

9. *A line is the boundary of a surface, it is the place where two surfaces meet or cut and has length only; it has neither breadth nor thickness.*

In the experiment of oil and water, the place where the surface of the glass meets the surface between oil and water, is a line.

[Take a cube or any solid. Ask the boys to show the ends or boundaries of a surface in it. Teach their names as edges or lines. In the same manner, ask them to show two surfaces on the cube and make them know that the place where they meet, being the same as the boundary of a surface, is a line; they being merely the ends of surfaces have length only; if they should have breadth also, they become surfaces. The teacher may now, with his box of solids, exercise the boys in lines.]

10. *A point is the boundary of a surface; it is the place where two surfaces meet or cut; and has length only: it has neither breadth nor thickness.*

[Ask the boys to show the ends of a cube or of any solid and call them corners or points. Show the other things also in the same manner. The teacher may now, if he likes, teach them the measures by which solids, surfaces, and lines are measured that they may become useful in arithmetic.]

CHAPTER II.

STRAIGHT LINES.

11. *A straight line is the shortest distance between any two points which determine it.*

Lines are of two kinds:—Straight and curved.

The edge of a rule is straight. A thread tightly pulled up by the two ends is straight; a thread carelessly laid down on the table is curved. To draw a straight line, two points are necessary, and they may be joined by a rule. It is therefore marked and named by two letters placed at the two ends. Any other line joining these two points being broken is more distant. This may be known by actual measurement. By the aid of a rule we may also lengthen a straight line.

[Take a straight rule and bring your eye on a level with the edge of it. If you see every part of the line from end to end you may be satisfied that the edge is straight; if not, it is curved. Make the class see that when the thread is carelessly laid on the table, it is impossible to see the whole of it from end to end in a line; whereas, the whole of it can be seen when it is held tight, being straight.]

12. *Two straight lines cannot enclose a space.*

The two extreme points of a straight line being determined, all the other points lie evenly between them. So, if the extreme points of two straight lines coincide, the remaining points being between them should also coincide.

[Take two straight rules and show to the class that it is quite impossible to make their ends only coincide without their whole coinciding.]

13. *To compare two straight lines*

Bring one of the ends of the two straight lines together placing one over the other on the same side. If the other two ends also coincide, the straight lines are equal; if one of them falls within the other, it is said to be less than the other. If it goes beyond the other, it is said to be greater. To show equality = is used; > for greater, < for less, are used.

[Take two pieces of thread and ask the boys to compare them, they will suggest the method to be adopted.]

14. *A figure is that which is enclosed by one or more boundaries.*

One or two straight lines cannot enclose a space. A space may be closed on all sides by one, two, or more boundaries. When the space is closed, the enclosed space is called a figure.

[Draw various figures on the board closed and not closed, and point out that those which are closed are figures.]

15. *A plane figure is a figure bounded by lines drawn on a plane surface.*

Fignres may be drawn on plane surfaces such as paper and board or on curved surface. The figures drawn on a plane or a flat surface is called a plane figure.

[Give them a clear idea of the above and tell them the figures, such as are drawn in this book are only plane figures.]

16. *A plane rectilineal figure is a plane figure contained by straight lines.*

It is seen clearly from the drawings on the board that some of the figures are bounded by curved lines only; some, both by curved lines and straight lines; some, by straight lines only. Those that are contained by straight lines are called rectilineal, meaning, *right-lined.*

17. *Trilateral figures are figures contained by three straight lines.* *Trilateral* means *three-sided.*

18. *Quadrilateral figures are figures contained by four straight lines.* *Quadrilateral* means *four-sided.*

19. *Multilateral figures or polygons are figures contained by more than four straight lines.*

Multilateral and *polygon* both mean *many-sided.*

[Draw sketches of the above on the board and explain them to the class.]

CHAPTER III.

CIRCLES.

20. *A circle is a plane figure bounded by a curved line every part of which is equally distant from a point within it.*

Fix a large sheet of paper on a table by means of pins. Make holes in a thick piece of card-board and pass a pin through one of them to fix it to the table. Place the point of a pencil in the other and move it round. It will describe a curved line. The plane figure enclosed by the line is called a circle. And the distance, from the pin to every point on the curved line, is the same.

[Prepare the necessary apparatus for the above and actually do it before the class. Every part of the definition must be elicited from the class.]

21. *The circumference of a circle is the curved line which bounds a circle.*

Ask the boys to give familiar examples of a circle and to find out circles on the faces of the solids showing them to the class.

22. *The centre of a circle is the point within the circle, from whence all parts of the curve are equally distant.*

The pupils should be reminded of the fixed pin when the circle was described and show the position of it from the surrounding line. Hence the name centre elicited from the class. The pupil should then be told that the circles are generally described easily by the aid of the compasses, the instrument and the use of which should be shown to the class by actually taking a compasses and describing a circle. They should also be shown how to describe a circle on the black-board holding one end of a thread fixed on it, and moving the other end with a chalk tied to it, tightly round the fixed point.

[It should now be shown to the class that by the aid of a rule and a compasses, distances can also be measured.]

23. *The radius of a circle is a straight line drawn from the centre to any point on the circumference.*

All radii of a circle are equal to one another.

[Radii is the plural of Radius.]

[Describe a circle on the board, take a point on the circumference join it with the centre.]

[Make the boys measure the radii of a circle, by the rulers and show them that they are all equal.]

24. *A chord is a straight line joining any two points on the circumference.*

Describe a circle, take any two points A. B., on the circumference and join them.

25. *A diameter of a circle is a straight line drawn through the centre as far as the circumference on both the sides.*

Describe a circle; take any point A in it on the circumference; join it with the centre B and produce A B to meet the circumference at C. Then A B is a diameter.

26. *A semicircle is a figure contained by the diameter and the circumference cut off by it.*

The diameter is exactly double the radius; it divides the circle into two equal parts; Each of the parts is called half a circle or a semicircle.

[Make the boys measure the diameter and a radius and prove the above.

Draw a circle with a diameter on a paper, and fold it by the diameter; the two halves will coincide shewing that they are equal.]

27. *An arc of a circle is any part of the circumference.*

28. *The sector of a circle is any part of it bounded by two radii and the arc between them.*

Take any two points on the circumference and join them with the centre. The figure now formed is a sector.

Draw the figures wanted for the above on the black-board and elicit the definitions.

CURE FOR BAD SPELLING.

In Sanskrit and the Dravidian languages to master the alphabet is to learn the whole clue to spelling and pronunciation. But unfortunately for the Indian student it is not so in English. The alphabet which is essentially the good old letters "that Cadmus gave" is at the same time defective and redundant; and on this account some difficulty is experienced

161255

by the learner. The same letter has several different sounds and the same sound is denoted by more than a single symbol. In short, the spelling does not strictly follow the sound, as the case is in our own languages.

This makes the art of spelling rather a hard nut to crack. It therefore behoves us not to let slip any available means for faciliating the process.

When boys in our schools are found guilty of orthographical sins some masters, who are a trifle too fond of Solomon's Maxim "Spare the rod and spoil the child," take to flogging them, the dose, of course, being proportionate to the seriousness of the offence. Comment on this course is quite unnecessary. Others again make the culprits spell out the words repeatedly a number of times. But this practice, it will be seen, is not likely to do much good. The essential aim of the student is not to be able to spell out words orally, but to be able to write them correctly; and the more effectual way of attaining this end will be by constant practise of writing rather than anything else. The eye and the fingers are more retentive for the purpose, than the tongue and the ear, and are better able to guard against slips. We have heard of travellers and horsemen whenever they were doubtful as to their route, trusting themselves entirely to the sagacity of the animal to find out the right course. In a similar manner we have a faithful guide in our fingers, the movements being regained in their muscles by a course of frequent repetition. We may all have experienced that when we begin to think about the spelling of a word we are apt to go astray, but if, on the other hand, we go on writing almost mechanically, it is ten to one we are right.

The study of the origin of words may also serve as a great aid towards deciding their spelling. As an objection to the phonetic system of spelling, it has been remarked that, though somewhat arbitrary, it aids the remembrance of their etymology. The converse is always true, that the knowledge of the rest of a word helps to enable one to spell it correctly. It is hoped therefore that when masters find young men addicted to bad spelling, they would rather subject them to the penance of writing out the words a good number of times, than inflict upon them any punishment, which will not only be simply useless, but mischievous in its consequences.

S. R. OF *Vizianagaram College.*

Correspondence.

From

THE HEADMASTER,
H. L. G. MISSION HIGH SCHOOL,
Tirupati.

To

THE EDITOR OF "THE SCHOOLMASTER,"
Madras.

SIR,

As the use of mathematical instruments seemed to me indispensable in teaching geometry I have urged the teachers and pupils of my school to use the same in the geometry lessons and exercises. I was also allowing

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this in answering the School examination papers on Geometry. But when my boys had taken the mathematical instruments to the examination hall in the late Middle School examination, the superintendent, the Deputy Inspector of Schools of the range, objected to their use in the hall. All arguments were in vain. Though I communicated the matter thorugh wire to the Director of Public Instruction I did not, as yet, receive any reply. It is now time for me to know the reply and as it is your duty, my dear Editor, to take up questions like these which are of public interest I hope you will move the matter before the authorities concerned and get it decided finally.

I beg to remain,
Sir,
Yours truly,
S. STEPHEN.

[While we accept our correspondent's suggestions we thank him for thus giving us an opportunity to discuss the question of teaching geometry in our schools. Geometry as a part of the curriculum of our school studies is intended to cultivate the reasoning faculties of our children. We may safely affirm that there are very few schools in the whole of the Presidency where the subject is rightly taught and we may also infer the state of the other schools of the Presidency from that of the so-called best schools of Madras where the number of boys in a class ranges generally from 40 to 60 and where with all the boast of superiority, the subject is not satisfactorily handled

Todhunter's or any other book will do as a text when teachers have known how to handle the subject. In the absence of such being the case, the teachers, as every one cannot be expected to be a specialist in the subject, should be provided with a suitable text-book aiming at the right line of study with some hints to elicit the constructions &c. Books on the subject have appeared of late, of which that published by Mr. John Adam, M. A., is one. He probably published it at first, that he might make it the text-book in his school; but it fortunately catching the eye of the Director was recommended to be adopted as the text in the whole of the Presidency. As far as we have known the book it is not very superior, to the text-books by Todhunter and Pott to be worthy of superseding those old books long used in schools here and abroad. If a new book should take the place of an old one it should be for some improvement which however is not the case with Mr. Adam's Euclid. The improvements in it are the Glossary which is given in the beginning of the book and the deductions given at the end of each proposition. The Glossary at the beginning, which adds to the bulk of the book is introduced that the knowledge of the Technical terms used in geometry may be easily communicated to the boys through the medium of their vernacular but how far this is true we are at a loss

tion, at least to lessen its severity. Constant application of salt-and-water was supposed to render the skin callous, and this was often resorted to by the victim, if he had time for meditation. Most of you have heard, I suppose, of the boy at one of our great public schools, who, being sentenced to be flogged, was recommended by his sympathetic brethren to obtain some unripe walnuts, and, having soaked them in water, to bathe with the liquid the part to be assailed, as being likely to have a hardening effect. When he appeared at the flogging desk, one part of his body was as brown as a berry, which had such an effect on the Headmaster that he fled, birch and all, and was quite unable to operate as he had intended. With regard to public flogging, we shall most of us, I fancy, agree that it is undesirable. As public executions, in consequence of their demoralising influence, have ceased by law, so custom and an improvement in the breed of padagogues have, for the most part, made public floggings a thing of the past. Private flogging still exists, though I think it is in an obsolescent state. The sooner it becomes obsolete, the better pleased I shall be, as I fail to see what advantage the birch possesses over the cane to counterbalance its more demoralising effects. To return to caning, most of us are both actively and passively cognizant of its *pros* and *cons*. It is certainly the most usual punishment in English schools, especially in those whose motto is, "Spare the rod and spoil the child." The cane is looked on by many as the symbol of their power, and many a private schoolmaster in England paces his school exulting in his cane, as Neptune in his trident, or Mercury in his *caduceus*, and only longing for the opportunity to arise when he may exhibit before the school his autocratic power and the strength of his biceps. Many are the different ways of caning and being caned. One man I knew who used, with the air of a Minos, or Rhadamanthus, to raise his cane solemnly as high as he could, and three times—he never exceeded it—bring it down on the victim's hand; while another would give a number of small quick strokes from the wrist, as if engaged in throwing a fly; one would become pale with emotion, another red with excitement; one would miss every other stroke, another never failed to score; one would cane for the most trivial fault, another for only the gravest offence. One man I knew who caned for a somewhat unusual cause. Several of his boys came to him representing they were wet, and asking to be allowed to go home. Having reason to believe that several of them had purposely stood under a spout on their way to school, he caned the whole class, to keep up, as he said, the circulation. I may add that he was an assistant master. Various expedients are adopted by boys to mitigate the severity of their caning. I have seen a boy discovered with four or five of Philip's copy-books carefully placed on his back under his coat. It was found out by the curious and unearthly sounds produced by the blows. Those of great experience will gently yield to the blow when given on the hand. This, I am told, has the same effect as properly catching a cricket ball. One boy will nearly faint with terror at the operation, while another will bear it with Stoic equanimity; one will howl in order that his master may have mercy on him, while another will scowl and devote his imagined persecutor to the gods below. Now comes the question: Is caning a good punishment? I think so, when very sparingly and judiciously used, because I fancy we shall agree that some species of corporal punishment is absolutely necessary in every well conducted school. Schools do exist where it

is strictly forbidden; the result in such schools is that, if a boy seriously misconducts himself by gross impertinence, lying, or other very serious offence, there is only one course open, and that is expulsion; while where it is allowed, a public caning before the school would show the heinousness of the offence, and give the offender room for repentance and reform. But this can only be done when caning is the exception, and not the rule. I have seen, in a large public school, 30 or 40 boys file in late after prayers, march up to the Headmaster, hold out successively right hand and left for two cuts on each, and, having thus purged their offence, retire to their seats. Now, this state of things is, in my eyes, improper and ridiculous, and renders caning a mere farce; boys soon become inured to it, and consider it no disgrace at all. Again, when boys are caned for every small offence they may commit, it is a great inducement to lying and deceit. It is, of course, every good master's desire to encourage an open, manly, and ingenuous spirit among his pupils. This is impossible where they are momentarily in fear of the cane. A boy will lie in order to escape punishment, and will perhaps succeed; his example will be followed by one after another, and thus, I maintain, a school where caning is rampant will soon become a hot-bed of lying and deceit. Before leaving this part of the subject, I would ask, should assistant masters be allowed to cane, or should it be left entirely in the hands of the Headmaster? I am of opinion that no one but the Headmaster should cane. I shall doubtless be told that this is easy to carry out in small schools not exceeding 100 or 150 boys, but that it would occupy too much of the Headmaster's time in a school of 500 or 600. If there were no more corporal punishment than is absolutely necessary, I think there would be no difficulty. Within the last few months I was talking to a naval officer in command of a training ship on which were 1,200 boys preparing for the Navy. I asked him who carried out the corporal punishment? He told me that no one on the ship but himself was ever allowed to touch a boy. Now, I think we may assume that young tars would be quite as troublesome, unmanageable, and deserving of punishment as the boys in our ordinary public schools. If, then, this naval officer could thus satisfactorily carry on the training of his boys, I fail to see why a Headmaster should be obliged, by reason of number, to delegate his caning power to his subordinate officers Assistant masters often enter on their office at a very early age, when the judgment is not formed and the temper is not properly under control. They are then very liable to commit errors of judgment, to make improper use of corporal punishment, and thus bring discredit on the schools of which they are masters. I recollect that I myself was placed, at the early age of 21, in sole charge of 42 boys, with full power to cane as I liked. I remember the many errors of judgment I committed, the number of boys I caned on what I should now consider inadequate grounds. I may add that reflection and experience wrought such a change in me that, during the latter half of my assistant-mastership, I never used the cane at all, and I can confidently assert that the condition of my classes was in every way better during the latter than the former half of my tenure of office.

I now come to the third head of my subject, and that is, the Writing of Lines. It is a question on which I can speak with the greatest possible experience, for I am sure that no Headmaster present at this meeting has approximated to

the number of lines that I had to write during school career, from 12 to 16, at a modest computation, I put them down at 500 a week. This, in the four years would amount to about 80,000 lines, had they been written in the usual way, but various devices were restored to, If a master were of a simple and unsuspecting nature, three pens were tied one over the other, and thus three lines were produced by the ordinary exertion for one. Again, if the lines were not torn through—as was often the case with a guileless pedagogue—but merely crumpled up and thrown into the grate or the waste-paper basket, they were carefully extracted damped with a sponge, but under a clothes-press, and made to do duty for another day. A regular traffic was carried on in them. Boys sold lines as they sold birds' eggs, stamps, or silkworms. The market price of 100 lines varied, of course, according to the law of supply and demand. Many kept a large store ready for a rainy day, and happy was accounted the possessor of a thousand or more. Now, what good does this line writing do? None. Rather, let me ask, what harm? It has ruined, irretrievably, the handwriting of thousands. How many boys have suffered seriously in the prosecution of their studies, by having to devote to line writing the time they would otherwise have given up to preparation. A boy goes home after school with work to do for the morrow, which will take him two or three hours, and an imposition of 500 lines. He can't do both without sitting up an unreasonable time at night, which his parents very properly will not allow. So he does the imposition, and neglects his work, trusting to good fortune to get him out of his difficulties. Fortune may favour him, and then there will be a temptation to idleness in the future. The reverse may be the case, and he will then get deeper and deeper into the slough of punishments, until perhaps, in a fit of desperation, he may be tempted even to run away from school. Line writing is, I am glad to think, almost a thing of the past. Its evils have been discovered; its advantages found to be nil. It is a question difficult of solution why it held sway for so long a time in many of our public schools. I think it may be traced in a great measure to two causes, (1) that it was very little trouble for a master to say 100 lines for this, and 500 for that, and (2) when they were done and shown up there was no difficulty or time wasted in looking them over.

Detention, which is the last species of school punishment on which I shall comment at any length may be said to consist of two kinds, which I will call *spurious* and *genuine*. Spurious detention consists in keeping a boy in school after school hours without any species of supervision whatever. Nine times out of ten, this will be of no good; a few boys may be found who will honestly obey orders and stick to their work during the time appointed, but the majority will idle and play with one another, and hurry over what they have to do. Some will even slip away, if they know there is little chance of the master coming back and taking them by surprise. I recollect, when I was at school, two boys of 16 years of age being brought down for three consecutive half-holidays, and locked up for three hours with three hundred lines of Virgil to write out each afternoon. The delinquents did the lines before they came, brought in with them a supply of cakes and ginger-beer, and amused themselves during incarceration with double-dummy, comparing the theories of Hoyle and Cavendish. The fact is that, if a master keeps boys in, he should stay with them ar[illegible] per-

vise their work. This may seem, at first sight, hard on the master; but school hours are not, as a rule long, and from my experience no assistant master will be found worth his salt who is not ready to devote time out of school to the good of his pupils. This system of keeping in, under proper supervision, is what I mean by genuine Detention. I would suggest that a book should be kept and taken round to every master on the morning of one of the half-holidays; that he should enter therein the names of any boys who, during the week, had been idle or misbehaved themselves, carefully discriminating between those who had failed to get on through their own fault, and those who had done so through incapacity; that to each boy's name should be attached the work he had to do, say Arithmetic, Algebra, Prose, Essay, etc., but not lines; that the masters should take it in turn to superintend the Detention, and should see that the work set is properly done. I believe this will have a much more deterrent effect than caning or lines, for boys will hate to be obliged to come down to school when they see their comrades going to cricket or football, while it will be at the same time an extra lesson to those who have wasted their opportunities. All punishments have their drawbacks. The greatest one to Detention, I take to be, is that it may interfere—and this will be especially the case in small schools—with the cricket and football matches. A cricket match is fixed, we will say, for the Saturday afternoon, and four of the best players are brought down; the team is ruined, and the school consequently miserably beaten. This, to many, would be a strong argument against the punishment I am now discussing; for I am sure that every Headmaster, in the present day, considers the athletic training of his pupils a part of the school curriculum, and feels that the honor of his school is considerably involved in those athletic contests which our schools yearly wage with each other. What, then, is to be done in such a case? I think that, as far as possible, members of the cricket and football elevens should be excused from detention, and should not be brought down unless it appear to be absolutely necessary. This mode of proceeding will have the additional advantage of giving a stimulus to boys in the school to endeavour to reach such a state of proficiency as will entitle them to be chosen members of their school teams. As a rule, too, I think it will be found that the boys excelling in athletics are not those most deserving of punishment. The victims of Detention will generally be found to be those who do nothing, either in school or out. There are, of course, irregular school punishments, such as boxing of the ears, pulling of the hair, etc. These, I am happy to say, are mostly confined to private schools. I can recollect, in my early days of school life, being under an aged dame whose course of punishment, even for the most trivial offence, was ruling on the back, varied with Carpenter's Spelling in the eye. At length I fled, was captured and taken back to additional torture, and even now I hold the memory of that ancient dame in the deepest execration. In many private schools I believe boxing of the ears to be still a common form of punishment. A boy happens to be very dense; the master is possibly a little dyspeptic; the former cannot undestand what is told him; the latter stouts, raves, and gesticulates in vain; at last, in a moment of fury, he soundly boxes his pupil's ears. When the sensation is like, I forget; never but once did I experience it, and that was at the hands of the late Dr. Donaldson, for having finished up an Hex-

meter line with the wonderful ending *crude is infans.* Whatever, however, may be the sensation, the course of proceeding is to be deprecated for many reasons. Many a boy has become deaf from a blow on the side of his head, and has remained for years a monument of the incapacity of his master. Boys, too, are quick in seeing that a master has forgotten himself, and it will be a considerable time, if ever, before he is respected as he was before. It is a practice of which I most strongly disapprove, and for which, after one warning, I would dismiss any assistant master in my school. Indeed, I think that any man who indulges in the practice is totally unfit to be a schoolmaster, and had better turn his attention to some other profession.

To sum up, I hope we shall all agree that, with masters who understand their business, little or no punishment is required; that boys are not as idle and troublesome as they have been painted; that if a master will sympathise with his boys, and interest himself in their doings, in the play field as well as in the school, they will do almost anything for him, and punishment will become, as far as he is concerned, quite the exception, and not the rule; that corporal punishment of some kind is absolutely necessary as a *dernier ressort*, and that the cane—in spite of traditions—is less degrading and demoralising than the birch; that, when corporal punishment is required, it should be inflicted by the Head-master alone; that the assistant masters should on no occasion be allowed to touch a boy with the cane; that the idea of delegating such power to head boys—as is still done in some of our public schools—is a monstrous absurdity, tending to eradicate some of the better feelings of a school-boy, such as sympathy with his fellows, and to lay the seeds of a tyrannical nature; that the writing of lines is an abomination, not to be tolerated, and only to be remembered as an abuse of the past, along with such other atrocities as the Boot, the Thumb-screw, and the Scavenger's-daughter; that Detention in school, under proper supervision, is the only really satisfactory punishment; that it has fewer drawbacks than any other, and more effectually provides both punishment and instruction.

TOM COLLINS.

(English Journal of Education.)

161255

Notes of Lesson.

GLASS.

[illegible] blackboard, &c., white sand, quartz, lime, red-lead, soda ash, [illegible] carbonate; glass rod, glass tubing, spirit lamp, or Bunsen-burner, blow-pipe, and different kinds and qualities of glass.

MATTER.	METHOD.

MATTER.

(*a*) A POWDER.—Glass is smooth, brittle, transparent, and *fusible*. By being "fusible" is meant that it can be melted by means of great heat. The melted glass may be moulded. When first made it is in an extremely hot, molten state. This hot liquid glass "is made by heating together in a hot fire or furnace a mixture of *white sand, lime* and *soda*; or of *sand, oxide of lead* and *potash*. The first mixture forms what are known as *plate-glass* and *window-glass*; the second produces *flint-glass*." To make window-glass, about equal quantities of lime and soda are taken, together with four times that quantity of broken window-glass, respectively. In flint glass the proportions are—sand, 10; oxide of lead, 6; potash, 4; broken flint glass, 5 to 10. *Lime* gives the glass hardness; *lead* makes it more brilliant; *soda and potash* make it more fusible. Potash gives better glass than soda, but the latter is mostly used owing to its cheapness. Soda is made from salt, potash is found in all ashes. Besides those mentioned, there are other substances introduced to produce special qualities or colours. When all the ingredients are got together in right proportions, the mixture is sifted, and looks like a salmon-coloured flour.

(*b*) A LIQUID.—The powder is put into a melting-pot which will contain 16 to 20 cwt. of glass.

Eight to twelve of these melting-pots are put into a dome-shaped furnace and heated strongly until the melted mass is clear and free from air bubbles. This sometimes takes three or four hours of white heat.

ANNEALING.—Glass articles, when first made, must "all be exposed to the process of annealing, or slow cooling; otherwise, they are so brittle as to be perfectly useless, breaking with the slightest touch, owing to the irregular contraction of the different parts, brought about by rapid cooling."

(*c*) SPECIAL KINDS.—*Coloured glass* is made by putting in certain extra ingredients; as for example, iron oxide, to produce a *green* glass used in making bottles; gold oxide, to give a *red* tint.

Stained glass is simply coloured glass, but much that is called stained glass is really painted. The paint used is a special preparation which will give the required colour, when, after it is applied, the glass is heated.

A kind of glass, in the making of which much lead is used, forms the brilliant imitations of *gems*.

METHOD.

During the greater part of this course the subjects have been taken up in "Inductive Lessons"; the present is an example of those which the writer has deemed best to treat as "Lessons of Information." The latter require the greater care and skill both in preparation and delivery. "The conditions on which the success of such a lesson depend are"—using the words of Gladman, in his "School Work," "orderly *arrangement*, apt *illustration*, the *association* of new matter with similar stores already existent in the mind, and a certain amount of *repetition*."

Introduce the lesson by comparing the specimens of glass with the subject of the last lesson from (iron).

Dwell on the word "fusible," and, if possible, melt a glass rod before the children. Connect with this the first state of the substance as "glass."

Refer to the lists of ingredients—written on the blackboard before the lesson—and show a specimen of each. During the review of this division, write on the blackboard against each ingredient its special use in the manufacture.

Under this head many opportunities will be given of linking the new facts with those of the lessons on iron.

Compare—the furnaces used in each case, the modes of placing the raw materials under the influence of the heat, the means taken to retain the molten liquid in the furnace, the heat required, the way in which the melted masses are taken out of the furnace.

Show a piece of glass in which a bubble was allowed to remain.

Lead the children to think of the glass as composed of minute particles, and recall the lesson on crystallisation and condensation.

In this lesson, the *processes* by which the various kinds of glass are made, are purposely not mentioned, but the specimens of glass brought by the scholars to illustrate the lesson, may each receive notice in the light of the information already given. In this way the final recapitulation could be made at the same time as new applications of the facts are shown.

A summary of the lesson should appear on the blackboard, and be taken down by the pupils to form the basis of a composition exercise.

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